

**IN THE CLAIMS:**

1-11. (Cancelled)

12. (new) A method for transmission of messages over a data network wherein a plurality of microcontrollers are connected with one another by the data network, comprising the steps of:

providing between the microcontrollers at least one type of communication system, the type of communication system between at least two of the microcontrollers comprising a dual-ported RAM;

providing an operating system on each microcontroller;

for a given communication task for sending a message, providing a transmitting microcontroller on which said communication task is executed, a desired arbitrary receiving microcontroller, and a transfer microcontroller adjacent to the transmitting microcontroller, and said communication task containing a routing table in which is stored routing information comprising

a list of said adjacent transfer microcontroller which is suitable for transfer of said message to said desired arbitrary receiving microcontroller, and

the corresponding type of said communication system to be used for the transfer of the message between the transmitting microcontroller and the suitable transfer microcontroller,

said routing information being provided for the message transfer from the transmitting microcontroller to said desired arbitrary receiving microcontroller;

(a) for transmission of said message to said desired arbitrary receiving microcontroller, reading from the routing table said suitable transfer microcontroller and said corresponding type of said communication system;

(b) transmitting the message to said adjacent microcontroller; and

repeating steps (a) and (b) at said adjacent transfer microcontroller until the message has been transmitted to the desired arbitrary receiving microcontroller.

13. (new) A method according to claim 12 wherein a data network  
5 is used which uses an inhomogeneous data network in which data are transferred with different protocols per segment.

14. (new) A method according to claim 12 wherein the dual-ported  
RAM is divided into two storage ranges which are used as a ring buffer for  
communication between the adjacent microcontroller and said transmitting  
10 transfer controller.

15. (new) A method according to claim 12 wherein actions are  
controlled in sync across the network;

each microcontroller comprises a counter with a count register and all  
counters are synchronized at least upon powering up the data network, and  
15 wherein the counters are set to a predetermined initial value;

after the initialization a uniform clock signal is sent to all  
microcontrollers by a clock line consistent for all microcontrollers;

the counters of the microcontrollers count the clock pulses of the clock  
signal; and

20 actions are initiated by control commands that are transferred over the  
data network and that contain a time signal in the form of a number value  
such that the control command is executed upon the corresponding  
microcontroller reaching said number value.

16. (new) A method according to claim 15 wherein all microcontrollers of the data network are synchronized in regular intervals at which the clock signal is interrupted, all counters of the microcontroller are uniformly set to a predetermined value, and the clock signal is again set to all  
5 microcontrollers.

17. (new) A method according to claim 15 wherein a serial network transferring the data, based on a two-wire line, is used as a data network.

18. (new) A method according to claim 15 wherein a clock signal is generated with a clock rate of 50 –200 KHz.

10 19. (new) A method according to claim 15 wherein temporally-critical information are provided with the current value of the count register of one of the counters at the point in time of their creation.

20. (new) A method according to claim 19 wherein the temporally-critical information comprises at least one of the elements selected from the  
15 group consisting of sensor data error messages and trace data.

21. (new) A system for transmission of messages, comprising:

a data network over which the transmission of messages occurs and wherein a plurality of microcontrollers are connected to one another by the data network;

20 between the microcontrollers at least one type of communication system, the type of communication system between at least two of the microcontrollers comprising a dual-ported RAM;

an operating system on each microcontroller; and

for a given communication task for sending a message, a transmitting microcontroller on which said communication task is executed, a desired arbitrary receiving microcontroller, and a transfer microcontroller adjacent to the transmitting microcontroller, and said communication task containing a  
 5 routing table in which is stored routing information comprising

a listing of said adjacent transfer microcontroller which is suitable for transfer of said message to said desired arbitrary receiving microcontroller, and

the corresponding type of said communication system to be used for  
 10 the transfer of the message between the transmitting microcontroller and the suitable transfer microcontroller,

said routing information being provided for the message transfer from the transmitting microcontroller to said desired arbitrary receiving microcontroller.

22. (new) A system of claim 21 wherein the microcontrollers  
 15 comprise microcontroller modules, at least one of the microcontroller modules is designed as a control module with an administration assembly and with a real-time assembly but are connected via said dual-ported RAM, and at least a control assembly that comprises a plurality of microcontrollers, the microcontrollers of the control assembly being connected via a CAN data bus,  
 20 and the controller assembly being connected with the real-time assembly over a CAN data bus.

23 24. (new) A method for transmission of messages over a data network wherein a plurality of microcontrollers are connected with one another by the data network, comprising the steps of:

providing between the microcontrollers at least one type of communication system, the type of communication system between at least two of the microcontrollers comprising a dual-ported RAM;

5 for a given communication task for sending a message, providing a transmitting microcontroller on which said communication task is executed, a desired arbitrary receiving microcontroller, and a transfer microcontroller adjacent to the transmitting microcontroller, and said communication task containing a routing table in which is stored routing information comprising

10 a list identifying said adjacent transfer microcontroller which is suitable for transfer of said message to said desired arbitrary receiving microcontroller, and

the corresponding type of said communication system to be used for the transfer of the message between the transmitting microcontroller and the suitable transfer microcontroller,

15 said routing information being provided for the message transfer from the transmitting microcontroller to said desired arbitrary receiving microcontroller;

for transmission of said message to said desired arbitrary receiving microcontroller, reading from the routing table said suitable transfer microcontroller and said corresponding type of said communication system;

20 and

transmitting the message to said adjacent microcontroller and then to the desired arbitrary receiving microcontroller.